

Patent Claims

1. A method for generating an optical laser pulse (Po), in which
 - 5 - a main laser (30) is driven with an electrical control signal (St), and
 - the optical laser pulse (Po) is generated by means of the main laser (30),
 - an optical injection pulse (I) of an auxiliary laser (50) being fed into the main laser (30), and
 - the optical injection pulse (I) being generated in such a way that it arrives in the main laser (30) at a point in time at which, on account of the control signal (St), the charge carrier density in the main laser (30) has just reached or just exceeds the threshold charge carrier density.
2. The method as claimed in claim 1, characterized in that
 - 20 - the optical injection pulse (I) is generated by application of an electrical auxiliary control signal (HSt),
 - the auxiliary control signal (HSt) being applied to the auxiliary laser (50) temporally before the control signal (St) is applied to the main laser (30), and
 - the time difference between the application of the control signal (St) to the main laser (30) and the application of the auxiliary control signal (HSt) to the auxiliary laser (50) corresponding to the time period required by the optical injection pulse (I) from the auxiliary laser (50) to the main laser (30).
- 35 3. The method as claimed in claim 2, characterized in that
 - the time-offset application of the electrical control and auxiliary control signals (St, HSt) is

effected by suitably selecting the electrical propagation times of the control signal (St) and of the auxiliary control signal (HSt) to the main and auxiliary lasers.

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4. The method as claimed in claim 3,
characterized in that

- the electrical control signal (St) and the auxiliary control signal (HSt) are generated by the same signal generator (10),

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- the signal generator (10) being connected to the main laser (30) via a first drive line (20) and to the auxiliary laser (50) via a second drive line (40).

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5. The method as claimed in claim 3, characterized in that
 - the control signal and the auxiliary control signal are generated by two synchronized signal generators,
 - one signal generator being connected to the main laser via a first drive line and the further signal generator being connected to the auxiliary laser via a second drive line.

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15. The method as claimed in claim 4 or 5, characterized in that
 - the length (L_1) of the first drive line (20) is selected in such a way that the propagation time of the control signal (S_{st}) to the main laser (30) is of the same magnitude as the propagation time sum resulting from addition of the propagation time required by the auxiliary control signal (H_{st}) to the auxiliary laser (50) via the second drive line (40) and the propagation time required by the optical injection pulse (I) from the auxiliary laser (50) to the main laser (30).

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7. The method as claimed in one of the preceding claims, characterized in that
 - the optical injection pulse (I) of the auxiliary laser (50) is fed into the main laser (30) via an optical splitter (120), and
 - the optical laser pulse (P_o) of the main laser (30) is coupled out via said optical splitter (120).
8. The method as claimed in one of the preceding claims, characterized in that

- the optical injection pulse and/or the optical laser pulse are generated by a semiconductor laser.

9. The method as claimed in one of the preceding claims,
5 characterized in that

- 5 - the optical injection pulse is generated by a laser that emits essentially in monomode fashion, preferably a DFB laser or a DBR laser, and the optical laser pulse is generated by a multimode laser, preferably a Fabry-Perot laser, (30).
- 10 10. The method as claimed in one of the preceding claims, characterized in that
- 10 - a multiplicity of optical laser pulses are generated in the manner described.
- 15 11. A device for generating an optical laser pulse (P_o) having
- 15 - a main laser (30), which is driven with an electrical control signal (S_t) and generates the optical laser pulse (P_o), and
- 20 - an auxiliary laser (50), which is optically connected to the main laser (30) and feeds an optical injection pulse (I) into the main laser (30),
- 25 - an electrical auxiliary control signal (H_{St}) being applied to the auxiliary laser (50) in such a way that its optical injection pulse (I) arrives in the main laser (30) at a point in time at which the charge carrier density of the main laser (30) has just reached or just exceeds the threshold charge carrier density.
- 30 12. The device as claimed in claim 11,
- 30 characterized in that
- 35 - the auxiliary control signal (H_{St}) is present at the auxiliary laser (50) before the control signal (S_t) is present at the main laser (30),
- 35 - to be precise in a manner time-offset by a time difference corresponding to the time period required by the optical injection pulse (I) from the auxiliary laser (50) to the main laser (30).

13. The device as claimed in claim 12,
characterized in that

5 - the time-offset application of the electrical
control and auxiliary control signals (St, HSt) is
effected by suitably selecting the electrical
propagation times of the control signal (St) and of
the auxiliary control signal (HSt) to the main and
auxiliary lasers (30, 50).

10 14. The device as claimed in claim 13,

characterized in that

- the main laser (30) and the auxiliary laser (50) are connected to the same signal generator (10) via a first drive line (20) and via a second drive line (40), respectively, said signal generator generating the electrical control signal (St) for the main laser (30) and the auxiliary control signal (HSt) for the auxiliary laser (50).

10 15. The device as claimed in claim 14,
characterized in that

- the main laser (30) is connected to one signal generator (10) via a first drive line (20) and the auxiliary laser (50) is connected to a further signal generator (10) via a second drive line (40),
- the two signal generators (10) being synchronized.

16. The device as claimed in claim 14 or 15,
characterized in that

20 - the length of the first drive line (20) is selected in such a way that the propagation time of the control signal (St) to the main laser (30) is of precisely the same magnitude as the propagation time sum resulting from addition of the propagation time required by the auxiliary control signal (HSt) to the auxiliary laser (50) via the second drive line (40) and the propagation time required by the optical injection pulse (I) from the auxiliary laser (50) to the main laser (30).

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30 35 17. The device as claimed in one of the preceding claims 11 to 16,
characterized in that

- the main laser (30) is connected to the auxiliary laser (50) via an optical splitter.

18. The device as claimed in one of the preceding claims 11 to 17,

characterized in that

- the auxiliary laser (50) and/or the main laser (30) are/is a semiconductor laser.

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19. The device as claimed in one of the preceding claims 11 to 18,

characterized in that

- the auxiliary laser (50) is a laser that emits essentially in monomode fashion, preferably a DFB laser or a DBR laser, and the main laser (30) is a laser that emits in multimode fashion, preferably a Fabry-Perot laser.

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